

Is the Improved Financial Performance after Broader Reforms and Privatisation Long-Lasting and Uniform Across Industries?

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Abstract: The long-run financial performance of industries after broad reforms, including privatisation, has rarely been investigated. This study addresses this issue and examines the financial and operational performance within the Pakistani cement industry by utilising data covering two decades of the post-reform period. The study then compares the findings against four other industries from the manufacturing sector. Our empirical estimates reveal that, similar to the findings of many early studies, privatised firms improved their profitability, capacity utilisation, liquidity, solvency and leverage indicators in the short run, but recorded either a statistically significant decline or at best no change in profitability, financial prudence and capital investment over a longer post-reform and privatisation period. The long-run decline in profitability was also widespread across the other comparable industries.

Interestingly, the improvement in liquidity and solvency indicators for privatised firms was better than for firms that had always been private in the immediate period but only lasted briefly. The one exception is labour use efficiency in terms of sales/income per employee and real sales, which indeed significantly improved over the longer post-reform/privatisation period. However, this improvement is mostly limited to the cement industry when compared against four other industries in the Pakistani manufacturing sector.

Keywords: Financial performance; Broader reforms; Privatisation; Cement industry; Pakistan

JEL Classification: D41, L13, L61

1. Introduction

In contrast to stated aims of different governments in implementing privatisation programmes, the available empirical evidence on the actual impact of privatisation on firms' profitability, efficiency, output, investment, employment and leverage has been mixed. Most of the early influential studies regarding the impact of reforms on financial performance are based on short-run analysis of the cross-sectional or limited-period panel data covering firms from many industries that are difficult to compare. The estimates derived from longer periods, from either the same industry or similar industries, are likely to be more resistant to fluctuations in economic and industry-specific conditions and short-term distortion created by other government policies besides privatisation. Considering all these points, a natural research question is the following: Is the change in financial performance after broader reforms and privatisation long-lasting and uniform across similar industries? A primary objective of this study is to answer this question and compare the

financial and operational performance of public and private ownership periods over a longer time period for one industry and compare it against similar industries from the same country. Our study utilises data covering 21 cement-producing firms from Pakistan over a 26-year period. The financial and operational performance of privatised cement-producing firms is compared with firms' setup under private ownership structures prior to and after privatisation. Subsequently, cement-producers are compared against firms from four other industries in the Pakistani manufacturing sector to provide a better perspective of the cement industry's long-run performance. In the context of evaluating solely the financial impact of privatisation, we have not been able to identify many other studies that utilise such a long time period from a developing country.

The findings of this study for cement-producing firms can be summarised in five points. (1) A group of privatised firms improved their profitability margins in the short run, but then became significantly less profitable over longer post-privatisation time periods. The long-run decline in profitability was, however, widespread across the other comparable industries as well. (2) The initial impact of reforms on privatised firms' efficiency was, to a large extent, positive but longer term benefits are mostly uncertain as this improvement is mostly limited only to the cement industry when compared against four other industries in the Pakistani manufacturing sector. (3) Privatised firms improved their leverage and net worth in the first few years, but a long-lasting impact is not supported by our study. At best, firms' net worth and leverage position remained better than they were before privatisation for up to 10 years in the post-reform period. (4) Output of privatised firms approximated by inflation-adjusted sales did improve, but capital investment declined over the long run. However, the increase in output for other comparable industries over 10 years in the post-reform period is not uniform across different kinds of ownership. The findings of this study thus casts serious doubt on earlier influential and widely cited empirical findings that were based on a few years of post-privatisation data and that lacked due consideration of initial conditions as well as economic, firm-specific and industry-specific factors.

The rest of the paper comprises five sections. Section 2 presents a review of existing evidence on the impact of privatisation and reforms on firms' financial and operational performance. Section 3 contains information on the Pakistani cement industry's institutional set-up and working conditions. Empirical design is discussed in the next section. Data sources and empirical results are presented in Section 5. Lastly, Section 6 consists of a summary of our main empirical findings.

2. Post-privatisation and Reforms Outcomes — A Review of Literature

In the context of the Pakistani privatisation programme, remarkably few studies are available with contradictory findings including Aftab and Khan (1995), Naqvi and Kemal (1997) and, more recently, Ghulam and Jaffry (2015) and Ghulam (2017). By looking at the summary of findings from earlier international studies presented in Table 1, it could be argued that although there is a vast literature on the impact of broader reforms and privatisation on firms' operational and financial performance, the evidence is inconclusive. There could be a number of reasons for the contrasting conclusions. Firstly, it could be due to the research methodology used in each study. A significant number of studies used non-parametric methods to estimate the pre- and post-privatisation efficiency, productivity and financial outcome of privatised and non-privatised firms. These methods have been criticised for poorly dealing with outliers in the data, convergence issues due to low number of observations and the inability to account for initial conditions and the joint impact of firm- and industry-specific factors. Parametric methods, on the other hand, are subject to criticism

due to strong assumptions required to estimate production/cost/profit function parameters. Secondly, as discussed in our introduction, earlier pioneering and well-cited studies on the impact of reforms and privatisation on firms' financial performance, in particular, published in finance-centric journals, have generally used a short time span and the aggregation of different industries.

Table 1. Firms' financial and operational performance after broad reforms and privatisation

| Authors of study | Firms in the sample | Sample | Main findings after reforms and privatisation |
|-------------------------------|---------------------------------------|---------|---|
| Cross-country studies | | | |
| Meggison <i>et al.</i> (1994) | 41 firms from fifteen countries | 1961–92 | Better performance |
| Boubakri <i>et al.</i> (2004) | 50 firms from 10 Asian countries | 1980–97 | Better performance |
| D'Souza <i>et al.</i> (2005) | 129 firms 23 developed countries | 1961–99 | Better performance |
| Boubakri <i>et al.</i> (2005) | 230 firms from developing countries | 1980–99 | Better performance |
| Mathur & Banchuenvijit (2007) | 103 privatised firms worldwide | 1993–03 | Better performance |
| Naceur <i>et al.</i> (2007) | 95 privatised firms of GGC countries | 1990–01 | Better performance |
| Cook & Uchida (2008) | 166 firms from developing countries | 1993–02 | Low performance of privatised utilities |
| Longitudinal Studies | | | |
| Wei <i>et al.</i> (2003) | 208 privatised Chinese firms | 1990–00 | Better performance |
| Huang & Wang (2011) | 127 Chinese firms | 1996–05 | Better performance |
| Chen <i>et al.</i> (2006) | 1078 Chinese companies | 1991–04 | Profitability & asset utilisation decreased |
| Li <i>et al.</i> (2007) | 155 Chinese firms | 1992–00 | Profitability declined after change of policy |
| Zhang <i>et al.</i> (2012) | 364 Chinese firms | 1999–05 | Profitability low. Output & efficiency better |
| Villalonga (2000) | 24 Spanish firms | 1985–95 | Better performance |
| Farinós <i>et al.</i> (2007) | 84 privatised & private Spanish firms | 1990–01 | Better performance |
| Ghosh (2008) | 126 public sector Indian firms | 1992–05 | Better performance |
| Harper (2001) | 178 privatised Czech firms | 1989–94 | Profitability & efficiency lower |

Our efforts to compile a large financial historical dataset from a developing country provided us with an opportunity to compute a number of alternative financial ratios for more robust and detailed analyses.

3. Institutional Set-up of Pakistani Cement Industry

At the beginning of 1986 the Pakistan cement industry consisted of 17 operating plants with a total nominal installed capacity of 7.7 million tonnes per year (tpy). Thirteen of the plants, comprising about 6.0 million tpy (78% of total capacity) belonged to public and four, with installed capacity of 1.63 million tpy, were in the private sector. By the end of 1996, the total number of cement manufacturing firms had increased to 23, with six new firms entering the market between 1988 and 1996 (all in the private sector). Since that time, a number of new firms have entered the market, and some older established firms were acquired by the competing firms. The first clear indication of the reversal of the nationalisation policy in Pakistan came in 1990, when the government sold 66 industrial units and commercial banks to the private sector during 1991–92. The privatisation of the cement industry started in 1992, when eight firms were privatised. The privatisation process for two other firms was postponed due to a payment delay and finalised later. The privatisation of three cement-producing firms was completed in 1996 and 2003. A majority of existing firms expanded their productive capacity subsequent to reforms and privatisation. After the mergers and acquisition, the number of cement manufacturing plants in the country was 21 in 2011, and the productive capacity had increased to 45 million tpy.

The market underwent both quantitative and qualitative change after 1991–92. It is no longer a 'seller's market' and prices have responded to market forces following events such as the commissioning of new private sector cement plants, the abandonment of cost-plus pricing, the elimination of the freight subsidy and the overall competitive market environment. The domestic

market is now divided into two main geographical zones, north and south. After the privatisation of state-owned firms, State Cement Corporation of Pakistan (SCCP) lost its power over the cement sector and the All Pakistan Cement Manufacturer Association (APCMA), representing more than 80% of private and privatised cement manufacturers in the country, set a price agreed to by all its members. The APCMA claims that these prices represented the prevailing economic and market conditions in terms of demand and supply of cement. There are, however, unproven counterclaims of price manipulation by the association. The detailed discussion on this controversy is beyond the scope of this study.

4. Firms' Financial Performance Analysis Methodology — Use of Financial Ratios

Starting with profitability, our analysis began with return on sale (ROS) calculated as net after tax income/gross sales. This was preceded by (1) first return on assets (ROA1), defined as net profit before tax/assets; (2) second return on assets (ROA2), or gross profit (loss)/assets; (3) first operating profit margin (OPM1), or (gross profit (loss) - admin & selling exp.)/net sales; (4) second operating profit margin (OPM2), defined as (gross profit (loss) - admin & selling exp.)/total assets; and (5) gross profit margin (GPM), which is (gross profit (loss) + depreciation)/net sales. We used six ratios to evaluate firms' operating and financial efficiency: labour use efficiencies measured by net income per employee (NIE), sales per employee (SE), assets per employee (ASPE), capacity utilisation (CAPUT), interval measure (IM), and average collection period (ACP). Similarly, two proxy ratios were computed to determine the capital investment performance: capital investment to sales (CAPSAL) and capital investment to total assets (CAPAS). In doing this, we added yearly capital expenditures on land, building, equipment and machinery to determine the yearly investment of firms. We examined output by using inflation-adjusted real sales (RSALE). To measure the insurance against financial insolvency of the firms, balance sheets as well as income statement accounts were used to determine the firms' leverage position. For liquidity, solvency and leverage, we used financial ratios such as cash ratio (CR) that utilises the most liquid current assets such as cash on hand and short-term investment in stocks divided by current liabilities, the working capital ratio (WCR), net worth relative to total liabilities (NWTL), the leverage ratio (LEVER), and the time interest earned (TIE) ratio.

Similar to a large number of studies that have evaluated privatised firms' financial performance, such as the widely cited studies of D'Souza *et al.* (2005) and Megginson *et al.* (1994), we first computed empirical proxies represented by the financial ratios above and then used a Wilcoxon signed-rank test (with its Z version) as our primary non-parametric method of testing for significant change in the post-reform/privatisation years against the pre-reform/state-ownership period. This procedure evaluated whether or not the difference in ratio values between pre- and post-reforms/privatisation periods was zero. We build our conclusion on a standardised test statistic, which requires a normal distribution.

5. Empirical Results

We utilised a number of sources to assemble data and subsequently calculate financial ratios. These sources include, but are not limited to, annual reports of firms; publications of the Ministry of Production and Industries, State Bank of Pakistan, and Ministry of Finance; the Census of Manufacturing Industries; Cement Directory (1991); and Fifty Years of Pakistani Statistics. In our

presentation and discussion of the impact of reforms and privatisation on firms' financial and operational performance, we discuss median statistics on profitability, efficiency, output, investment, liquidity, solvency and leverage conditions of the overall industry as well as firms classified by their ownership status. For sensitivity analysis, we computed and present similar financial statistics and performed non-parametric tests on a sample of four other industries of the Pakistani manufacturing sector that went through similar transitions during a comparable time period. This should provide an understanding of the cement industry post-reform and privatisation in terms of financial performance in a broader context. To observe the impact of reforms over different time periods, we compare financial performance over immediate (5 years), mid-term (10 years) and longer (20 years) post-reform and privatisation periods of firms with three types of ownership (public, private and privatised).

5.1 Evaluating the impact of reforms and privatisation on cement-producing firms' performance

5.1.1 Profitability

The estimates of profitability margins in Appendix A show that the industry earned decent returns on sales and assets during the pre-reform period. Immediately after initiation of reforms and privatisation in 1991 and 1992, the industry became more profitable, but except for ROS, the ratios were not significantly different from pre-reforms levels. However, over the intermediate and longer post-reform periods, irrespective of the profitability ratio chosen, the industry became significantly less profitable compared to pre-reform levels. In the following discussion, we classify firms by ownership type and perform similar analyses and tests to observe the impact of reforms on firms with different kinds of ownership. Table 2 on the next page shows that privately owned firms earned almost double the margins of publicly owned firms during the pre-reform period. In the first five years of the post-reform period, this heterogeneity was significantly reduced (privatised and private ownership firms earned almost equal ROS and ROA). But since then, for privatised firms, a decrease in margins in the longer term seems to be more dramatic (from 7.74% to 1.04% on sales and 8.96% to 0.66% on assets). Firms that were not privatised in the first round of privatisation, and hence continued to be publicly owned, had some extremely disappointing results, earning lower profitability margins in the short, medium and long terms after the reforms. But this could have been due to sample selection bias. More profitable firms could have been sold in the first phase of mass privatisation.

Focusing only on ROS, as expected, and in accordance with the broader existing empirical literature on the impact of reforms on firms' profitability, showed that ROS improved immediately across all types of ownership except state-owned firms. But this improvement in profitability happened to be short-lived and the medium- and long-term impact was negative, whereby ROS decreased. For privatised firms, a decrease in profitability in the medium term was relatively marginal compared to the pre-privatisation period and not statistically significant, but over the long term, the decrease was substantial and statistically significant. Alongside change of ownership, the rise in demand and the substitution of old machinery perhaps helped the new management in achieving higher profitability in the immediate post-reform period. For firms under private ownership, the immediate impact of reforms in terms of improvement was stronger and statistically significant. Interestingly, except for two profitability ratios, the decrease in profitability over the medium and longer post-reform time periods for this group of firms was stronger and statistically significant.

Table 2. Long-run impact of broader reforms and privatisation on firms' performance

| Ratios | Privatised firms | | | | Public sector firms | | | | Privately owned firms both pre- and post-reforms | | | |
|--|--------------------|---------------------|------------|---------------|---------------------|---------------------|------------|---------------|--|---------------------|------------|---------------|
| | Pre-1992 median | Post-1992 median | Z value | Sig. level | Pre-1992 median | Post-1992 median | Z value | Sig. level | Pre-1992 median | Post-1992 median | Z value | Sig. level |
| <i>Immediate effect (5 years after reforms and privatisation)</i> | | | | | | | | | | | | |
| ROS | 2.99 | 7.74 | -2.45 | 0.01 | 2.99 | 0.80 | -0.02 | 0.99 | 4.03 | 8.07 | -2.63 | 0.01 |
| ROA1 | 5.53 | 8.96 | -1.99 | 0.05 | 5.53 | 1.14 | -0.36 | 0.72 | 5.48 | 6.63 | -2.01 | 0.04 |
| ROA2 | 12.02 | 13.86 | -0.11 | 0.92 | 12.02 | 13.05 | -0.18 | 0.86 | 23.14 | 16.67 | 2.13 | 0.03 |
| OPM1 | 11.74 | 19.28 | -0.90 | 0.37 | 11.74 | 8.22 | -0.38 | 0.71 | 25.79 | 25.63 | 0.04 | 0.97 |
| OPM2 | 8.99 | 11.32 | -0.21 | 0.84 | 8.99 | 7.75 | -0.34 | 0.73 | 21.42 | 13.42 | 2.10 | 0.04 |
| GPM | 27.24 | 29.36 | 0.37 | 0.71 | 27.24 | 19.29 | 1.15 | 0.25 | 37.09 | 39.12 | 0.95 | 0.34 |
| NIE | 0.02 | 0.14 | -3.26 | 0.00 | 0.02 | 0.01 | -0.18 | 0.86 | 0.05 | 0.22 | -3.92 | 0.00 |
| SE | 0.43 | 1.18 | -4.08 | 0.00 | 0.43 | 0.75 | -4.18 | 0.00 | 0.90 | 1.85 | -4.65 | 0.00 |
| ASPE | 0.51 | 1.70 | -2.81 | 0.01 | 0.51 | 0.88 | -3.52 | 0.00 | 2.22 | 3.06 | -4.18 | 0.00 |
| CAPUT | 92.54 | 102.88 | -2.66 | 0.01 | 92.54 | 80.84 | 0.05 | 0.96 | 95.73 | 118.71 | -2.59 | 0.01 |
| IM | 1.88 | 3.90 | -3.83 | 0.00 | 1.88 | 0.90 | -0.99 | 0.32 | 0.13 | 0.45 | -2.45 | 0.01 |
| ACP | 3.41 | 8.32 | -1.32 | 0.19 | 3.41 | 2.82 | 1.005 | 0.32 | 40.14 | 8.49 | 1.99 | 0.05 |
| LEVER | 42.42 | 22.23 | 3.53 | 0.00 | 42.42 | 53.34 | -0.84 | 0.40 | 29.25 | 23.98 | 1.28 | 0.20 |
| WCR | -4.46 | 35.87 | -4.46 | 0.00 | -4.46 | -22.19 | 0.38 | 0.71 | -16.78 | -15.41 | -0.69 | 0.49 |
| NWTL | 51.78 | 68.18 | -2.21 | 0.03 | 51.78 | 54.94 | 0.05 | 0.96 | 74.59 | 69.65 | 0.51 | 0.61 |
| CR | 16.68 | 31.77 | -4.45 | 0.00 | 16.68 | 11.90 | -0.65 | 0.52 | 8.29 | 7.33 | 0.60 | 0.55 |
| TIE | 4.51 | 6.63 | -2.95 | 0.00 | 4.51 | 1.89 | 0.59 | 0.55 | 1.82 | 5.16 | -3.16 | 0.00 |
| RSALES | 18.00 | 23.43 | -2.71 | 0.01 | 18.00 | 15.80 | 0.32 | 0.75 | 14.62 | 20.17 | -1.66 | 0.10 |
| CES | -1.17 | 1.78 | -1.30 | 0.19 | -1.17 | -2.69 | 0.24 | 0.81 | 7.97 | 9.67 | -0.23 | 0.82 |
| CEA | -1.68 | 1.43 | -1.47 | 0.14 | -1.68 | -1.51 | 0.18 | 0.86 | 15.10 | 6.03 | 0.84 | 0.40 |
| <i>Medium-term effect (10 years after reforms and privatisation)</i> | | | | | | | | | | | | |
| ROS | 2.99 | 2.16 | -0.02 | 0.99 | 2.99 | -6.67 | 0.65 | 0.51 | 4.03 | 2.43 | 0.80 | 0.43 |
| ROA1 | 5.53 | 4.04 | -0.05 | 0.96 | 5.53 | -5.89 | 1.30 | 0.20 | 5.48 | 2.35 | 0.42 | 0.68 |
| ROA2 | 12.02 | 7.92 | 1.77 | 0.08 | 12.02 | 3.49 | 1.44 | 0.15 | 23.14 | 7.55 | 4.63 | 0.00 |
| OPM1 | 11.74 | 8.67 | 1.36 | 0.17 | 11.74 | 3.37 | 0.67 | 0.51 | 25.79 | 13.32 | 3.86 | 0.00 |
| OPM2 | 8.99 | 5.66 | 1.45 | 0.15 | 8.99 | 1.14 | 1.04 | 0.30 | 21.42 | 4.90 | 4.73 | 0.00 |
| GPM | 27.24 | 25.10 | 1.27 | 0.21 | 27.24 | 9.87 | 2.42 | 0.02 | 37.09 | 28.40 | 4.07 | 0.00 |
| NIE | 0.02 | 0.04 | 0.20 | 0.84 | 0.02 | -0.06 | 1.57 | 0.12 | 0.05 | 0.09 | -0.68 | 0.50 |
| SE | 0.43 | 1.53 | -3.99 | 0.00 | 0.43 | 0.86 | -5.73 | 0.00 | 0.90 | 1.92 | -5.80 | 0.00 |
| ASPE | 0.51 | 2.43 | -3.08 | 0.00 | 0.51 | 0.96 | -4.61 | 0.00 | 2.22 | 3.84 | -5.18 | 0.00 |
| CAPUT | 92.54 | 92.09 | 0.25 | 0.80 | 92.54 | 76.26 | 1.68 | 0.09 | 95.73 | 85.72 | 1.13 | 0.25 |
| IM | 1.88 | 1.75 | -2.52 | 0.01 | 1.88 | 0.89 | -0.49 | 0.62 | 0.13 | 0.46 | -3.12 | 0.00 |
| ACP | 3.41 | 6.45 | -1.20 | 0.23 | 3.41 | 2.68 | 1.46 | 0.14 | 40.14 | 8.00 | 1.62 | 0.10 |
| LEVER | 42.42 | 25.93 | 3.93 | 0.00 | 42.42 | 53.34 | -0.88 | 0.38 | 29.25 | 23.51 | 1.36 | 0.17 |
| WCR | -4.46 | -3.85 | -2.13 | 0.03 | -4.46 | -26.86 | 1.01 | 0.32 | -16.78 | -18.48 | -0.23 | 0.82 |
| NWTL | 51.78 | 68.89 | -1.67 | 0.10 | 51.78 | 48.48 | 0.97 | 0.33 | 74.59 | 73.59 | -0.92 | 0.36 |
| CR | 16.68 | 16.78 | -2.77 | 0.01 | 16.68 | 11.90 | -0.51 | 0.61 | 8.29 | 4.85 | 1.29 | 0.20 |
| TIE | 4.51 | 3.54 | -0.72 | 0.47 | 4.51 | 0.48 | 1.99 | 0.05 | 1.82 | 2.41 | -1.38 | 0.17 |
| RSALES | 18.00 | 21.11 | -2.38 | 0.02 | 18.00 | 14.93 | 0.56 | 0.58 | 14.62 | 18.85 | -2.57 | 0.01 |
| CES | -1.17 | -1.83 | -0.13 | 0.90 | -1.17 | -3.16 | 0.86 | 0.39 | 7.97 | 1.84 | 0.97 | 0.33 |
| CEA | -1.68 | -1.03 | -0.24 | 0.81 | -1.68 | -2.81 | 1.18 | 0.24 | 15.10 | 0.71 | 2.00 | 0.05 |
| <i>Long-term effect (20 years after reforms and privatisation)</i> | | | | | | | | | | | | |
| ROS | 2.99 | 1.04 | 1.60 | 0.10 | 2.99 | -4.62 | 0.30 | 0.77 | 4.03 | 2.84 | 0.34 | 0.73 |
| ROA1 | 5.53 | 0.66 | 2.07 | 0.04 | 5.53 | -4.20 | 1.02 | 0.31 | 5.48 | 2.35 | 0.02 | 0.99 |
| ROA2 | 12.02 | 6.34 | 3.24 | 0.00 | 12.02 | 4.05 | 1.47 | 0.14 | 23.14 | 8.94 | 4.60 | 0.00 |
| OPM1 | 11.74 | 8.22 | 2.05 | 0.04 | 11.74 | 3.57 | 0.48 | 0.63 | 25.79 | 13.24 | 3.93 | 0.00 |
| OPM2 | 8.99 | 3.59 | 2.92 | 0.00 | 8.99 | 1.94 | 0.97 | 0.33 | 21.42 | 5.70 | 4.85 | 0.00 |
| GPM | 27.24 | 24.54 | 2.18 | 0.03 | 27.24 | 10.27 | 2.36 | 0.02 | 37.09 | 26.77 | 4.24 | 0.00 |
| NIE | 0.02 | 0.05 | 1.26 | 0.21 | 0.02 | -0.05 | 0.99 | 0.31 | 0.05 | 0.10 | -1.15 | 0.25 |
| SE | 0.43 | 2.04 | -3.91 | 0.00 | 0.43 | 0.87 | -6.10 | 0.00 | 0.90 | 2.93 | -6.51 | 0.00 |
| ASPE | 0.51 | 4.47 | -4.48 | 0.00 | 0.51 | 1.18 | -5.04 | 0.00 | 2.22 | 7.03 | -6.01 | 0.00 |
| CAPUT | 92.54 | 76.27 | 2.48 | 0.01 | 92.54 | 68.56 | 2.16 | 0.03 | 95.73 | 77.98 | 2.62 | 0.01 |
| IM | 1.88 | 0.75 | 0.44 | 0.66 | 1.88 | 1.21 | -1.31 | 0.19 | 0.13 | 0.69 | -3.77 | 0.00 |
| ACP | 3.41 | 6.70 | -2.66 | 0.01 | 3.41 | 2.66 | 1.61 | 0.11 | 40.14 | 4.46 | 1.99 | 0.05 |
| LEVER | 42.42 | 30.99 | 0.98 | 0.33 | 42.42 | 52.29 | -0.30 | 0.77 | 29.25 | 26.08 | 1.20 | 0.23 |
| WCR | -4.46 | -11.74 | -0.63 | 0.53 | -4.46 | -24.44 | 1.54 | 0.12 | -16.78 | -10.35 | -1.22 | 0.22 |
| NWTL | 51.78 | 70.55 | -0.88 | 0.38 | 51.78 | 44.26 | 1.25 | 0.21 | 74.59 | 76.59 | -2.43 | 0.02 |
| CR | 16.68 | 13.03 | -0.93 | 0.35 | 16.68 | 12.66 | -0.95 | 0.34 | 8.29 | 6.41 | 0.43 | 0.67 |
| TIE | 4.51 | 1.84 | 2.12 | 0.03 | 4.51 | 0.51 | 1.03 | 0.30 | 1.82 | 2.83 | -1.83 | 0.07 |
| RSALES | 18.00 | 21.10 | -1.42 | 0.16 | 18.00 | 14.73 | 0.51 | 0.61 | 14.62 | 24.38 | -4.27 | 0.00 |
| CES | -1.17 | 2.07 | -1.71 | 0.09 | -1.17 | -3.14 | 0.99 | 0.32 | 7.97 | 1.86 | 0.77 | 0.44 |
| CEA | -1.68 | 1.37 | -1.89 | 0.06 | -1.68 | -2.66 | 1.14 | 0.25 | 15.10 | 0.99 | 1.60 | 0.11 |

Notes: This table presents the median values for pre- and post-reform periods. The pre-reform period covers the years 1986–1991. For the tests of the significance of median change, we used the Wilcoxon signed rank sum test (with its Z statistics) as our principal statistic. The “Sig. level” column shows the significance level for the null hypothesis that the difference between two median values is zero. Ratios are calculated as explained in Appendix A.

On the other hand, public sector firms’ performance did not improve after the 1992 reforms, even during the period when firms of other ownership types experienced an improvement. As noted above, this could, in part, be due to sample selection bias in which more profitable firms were privatised first. Nonetheless, broader conclusions seem to be that firms have become less profitable in the long run after broader reforms and privatisation.

The ratios, such as ROA2, OPM1, OPM2, and GPM, were computed using gross profit rather than net profit. Gross profit in this case was the difference between net sales and cost of goods sold. It excluded interest payments on bank loans and other income. Similarly, OPM1 and OPM2, along with other income, also excluded general and administrative expenses. Interestingly, the improved impact of change of ownership type, over a shorter time span, is questionable when some adjustments are made in profit figures (as even the immediate improvements in these ratios were not statistically significant). For the group of firms already operating under private ownership, results were mixed (with ROA2 and OPM2 showing a statistically significant increase and for others vice versa) during the time period immediate following reforms. Not surprisingly, the impact of other income was even stronger over a longer time period. For two groups of firms (privatised and private), profitability indicators, excluding other income, significantly declined. For state-owned firms, though, the decline was not statistically significant. Due to possible sample selection bias, a definitive statement cannot be made in this regard.

5.1.2 Efficiency

Similar to the profitability ratios, we used a number of financial ratios to observe the impact of reforms and privatisation on firms’ operational efficiency. We started initially with three efficiency ratios that have been used frequently in the empirical literature: sales, assets and income per employee. Sales efficiency (SE) and asset efficiency (ASPE), non-parametric estimates shown in Appendix A reveal that reforms had a positive and significant impact on the industry as a whole during the immediate post-reform and privatisation period. This improved impact continued up to 20 years after reform. Net income efficiency, measured by net income per employee of industry, was also higher during the longer term post-reform period compared to pre-reform, but the median differences were not statistically significant. Table 2 shows that irrespective of ownership, firms improved their sales and assets per employee during immediate, medium and longer post-reform time periods. This increase was not only substantial but also statistically significant for all post-reform time periods. The non-parametric results further showed that for private and privatised firms, NIE improved significantly in the period immediately following reforms. The medium- and longer-term impact was also positive compared to 1986–91, but differences between pre- and post-reform were not statistically significant. In comparison to these results, state-owned firms showed a decline (although statistically insignificant) during the immediate, medium and longer post-reform time periods. One possible reason for the impressive improvement in SE and ASPE for the privatised firms could be due to significant reduction in the workforce before the privatisation of these firms through a ‘golden handshake’ programme. Asset efficiency improvement could also be due to a significant increase in firms’ fixed assets as a result of an increase in production capacities. It is worth mentioning that except for state-owned firms, firms of all other types invested in technology and production upgrades subsequent to the 1992 broader reforms and privatisation period.

Higher capacity utilisation (CAPUT) is widely cited as an improvement in the firm's operational efficiency as it may be the product of an aggressive marketing strategy, better maintenance of the plant/machinery and effective quality control measures, among other things. Estimates shown in Appendix A indicate that the industry as a whole recorded a significant improvement immediately after reforms and privatisation, but this improvement was short-lived, and the industry experienced a reduction of more than 16% in CAPUT levels over a longer term (20 years) after reform. This decline was also statistically significant. Similar to the overall industry, CAPUT increased significantly for firms already in the private sector and privatised firms during the first five years of privatisation and reforms. On average, CAPUT significantly increased by 10% (from 92% to 102%) for privatised firms during 1992–96. On the other hand, firms already in the private sector achieved a statistically significant increase of greater than 23% in CAPUT during this immediate post-reform time period. Public sector firms, on the other hand, faced a reduction of 12% in their CAPUT over the 1992–96 time period. The decrease was, however, statistically insignificant. As discussed above, firms in general were unable to continue the improved trend, and the industry as a whole, including almost all ownership types, witnessed a significant reduction in CAPUT over a longer post-reform time period. During the mid-term post-reform period, a decline in CAPUT was significant only for those firms that remained in state ownership after the 1991–92 'mass privatisation'.

Some other measures of operational efficiency include IM and ACP. IM is defined by adding most liquid assets, including cash and short-term investments, and then dividing by total financial expenditures (such as interest and principal payments on bank loans). This ratio measures the firm's ability to meet financial obligations. A higher ratio indicates that the firm's management is keeping a reasonable hedge against its liabilities. The test results in Appendix A and Table 2 suggest that, compared to the overall industry, firms with private ownership, irrespective of time period (immediate, medium or longer), increased their ability to meet short-term financial obligations in terms of a higher IM ratio.

For privatised firms, IM increased immediately after reforms and privatisation but then decreased significantly over the subsequent 10 years after reform. Over longer time periods, this decrease was not statistically significant but nonetheless a decrease. The ACP is defined as average receivables divided by average daily sales and is an activity or asset utilisation ratio. It determines the number of days that the average receivable is pending during the year and is closely associated with the operational efficiency with which assets are managed. The lower the ratio, the less time for collecting outstanding assets (receivables). The estimates contained in Appendix A show that industry-level ACP increased over the immediate, intermediate and longer post-reform time periods compared to pre-reform levels. These post-reform increases for the industry as a whole were not statistically different from pre-reforms levels. For the firms already in the private sector, the ACP showed a significant decrease over the long run. For privatised firms, there was a significant increase in ACP, indicating a more lenient policy of credit sales in the longer run post-privatisation period. This result is expected because as the competition gets tense, the amount of credit sales would increase to keep a loyal customer base intact. On the other hand, the ACP for state-owned firms declined, but the difference between pre- and post-privatisation periods was not statistically significant.

Overall, non-parametric results indicate that the labour use efficiency of the privatised firms improved initially after privatisation and other broader reforms, partly due to labour reductions brought about by a labour rationalisation programme with generous severance terms, along with increasing management efforts.

5.1.3 Financial leverage, liquidity and solvency

The non-parametric test results contained in Appendix A show industry trends for leverage, liquidity and solvency conditions over different time periods. The estimates indicate that the industry significantly reduced leverage and increased the industry net worth over the longer post-reform period compared to pre-reform levels. Cash cover, measured by CR, WCR and TIE, increased during the first 5 years after reform, but the differences between the pre- and post-period levels were not statistically significant. However, as with other indicators, momentum for cash cover was soon lost, and over the intermediate and longer time periods the industry recorded a significant decline in CR as well as in TIE. Table 2 shows these ratios of firms classified by their ownership type. For privatised firms, starting out with debt or financial leverage (LEVER), which comprises long-term borrowing and short-term loans, decreased immediately after reforms and privatisation, and this trend continued over medium and longer time periods. The decrease was, however, insignificant over a longer time period. The long-term improvement was statistically insignificant, but symbolic in the context of the fact that firms that were not privatised in the first phase were unable to improve financially and in fact accumulated more debt. The difference between the pre-reform time period and the immediate/medium post-reform period was not statistically significant for these state-owned firms. Further, competing firms from the private sector also reduced their debt, but again the difference between the pre- and post-reform periods was not statistically significant.

As expected, CR for privatised firms significantly increased, from 16.68% to 31.77% during the immediate post-privatisation period. However, no similar pattern emerged for the other types of ownership, that is, state-owned firms and those in the private sector. This trend also continued over the medium-term post-reform period and was statistically significant. However, over the longer time period, we observed a statistically insignificant decline in CR, but this decline was widespread across all kinds of ownership. The second measure of liquidity employed is WCR. This ratio is calculated by taking the difference between current assets and current liabilities, and then dividing by current liabilities. Using this ratio, we observed that similarly to CR, in the shorter time period, privatised firms recorded improvement, but the differences in the post-reform longer period compared to the pre-reform period were not statistically significant. But again, this was true of other ownership types for medium and longer time periods. A second approach to assessing solvency is the use of income statement ratios. We employed time interest earned (TIE), defined as taking the sum of gross profit and depreciation, subtracting operating expenses and then dividing by financial expenses. This ratio measures the number of times resources are available to pay off financial expenses. Table 2 shows that, on average, immediately after the initiation of privatisation, interest earned for privatised firms increased from 4.5 times to roughly 6.6 times. But similar to other indicators of financial and operational performance, this improvement turned out to be short-lived: over 20 years of post-reform, TIE in fact declined significantly. This was contrary to the private sector firms, which recorded statistically significant improvement.

5.1.4 Output and investment

Starting with industry averages, the estimates contained in Appendix A show that output approximated by real sales increased significantly for the 5 years immediately following reform. This trend also continued over the longer 20-year post-reform time period. Based on non-parametric test results contained in Table 2, the increase in real sales for privatised firms was not statistically significant over a longer time period. Interestingly, in statistical terms, the increase in the post-privatisation period was significant for firms already in the private sector for immediate, medium and longer time periods. The improvement in the real sales volume for privatised firms from 2004

onward is a remarkable result in the sense that, during this period, the economy overall and the large-scale manufacturing sector, in particular, experienced sluggish growth in output. Perhaps a significant investment in new technology helped these firms to achieve this result. Firms that remained in state ownership after the first round of ‘mass privatisation’ did not do well, and their sales actually declined during the post-reform period. However, the decline was not statistically significant. This could be due to either sample selection bias or (more likely) the fact that these firms were unable to compete with privatised or privately owned firms.

The industry trend of capital investment is presented in Appendix A. As discussed in the methodology section, we considered change in fixed capital formation expressed as a percentage of sales and total assets. Privatisation and other broader reforms had a positive and statistically significant impact during the initial 5 years of reform, but this trend did not continue; for the 10 and 20 years after reform, there was no increase, and in fact net change was mostly negative irrespective of the time period chosen. Table 2 shows the pattern of investment spending in the pre- and post-privatisation periods by industry and the three types of ownership. By looking at the direction of the trend and statistical significance, both firms that were privatised and those that had always been private made changes in their investment spending, but the most impressive increase was for the privatised firms over the 20-year post-reform period. The increase was statistically significant for both investment ratios (CES & CEA) over longer time periods. By looking at the magnitude of ratios, it appears that on average, privatised firms increased their capital investment spending from -1.17% to 2.07% of their sales after privatisation. Similarly, the capital expenditure to total assets figure rose from -1.68% to 1.37% in the post-privatisation period. Other firms, however, did not adopt similar investment strategies. Private and state-owned firms in fact experienced a decrease in their fixed capital formation.

5.2 Comparing the cement industry to firms in the manufacturing industry

To provide a comparative perspective in regard to cement-producing firms’ financial and operational performance after broader reforms and privatisation, we carried out a sensitivity analysis exercise and compared the cement industry’s performance against four other industries that had experienced *change of ownership* through the same mode of *ownership transfer* during almost the *same time period*. In this regard, we assembled and analysed data for four manufacturing industries: chemical, automobile, cooking oil and engineering. Similar to the cement industry, we computed financial ratios and compared privatised firms with their peers from the state-owned firms that were not privatised in 1991–92 due to a variety of reasons, as well as with firms that had always been privately owned. For this sensitivity analysis exercise, we restricted our analysis to the first 10 years of the post-reform period (1992–2001) due to financial and time constraints in compiling such detailed historical financial data, as well as to avoid the possibility that performance improvement or decline in a subsequent post-reform and privatisation period could have potentially resulted from the industry environment rather than from the broader reforms and change of ownership per se. Our matching sample comprised 98 firms from four manufacturing industries. These included 23 firms from the automobile industry (6 privatised, 9 state-owned, 8 private), 38 firms from the chemical industry (4 privatised, 12 state-owned, 22 private), 20 from the cooking oil industry (5 privatised, 10 state-owned, 5 private), and 17 from the engineering industry (2 privatised, 9 state-owned, 6 private).

Table 3 shows these test results for the cement industry alongside four other comparable industries. Similar to broader conclusions of the existing studies (summarised in Table 1), the short-term impact of the change of ownership was positive on profitability (measured by ROS) for the

privatised firms in only two out of five industries – including the cement industry – but none were statistically significant. In fact, for cooking oil and engineering, the short-term impact was not only negative but also statistically significant. Interestingly, except for the automobile industry, which enjoys significant market power due to import restrictions, the post-reform and privatisation impact on these privatised firms became negative over a relatively longer 10-year post-reform period and was statistically significant as well.

Table 3. Comparative performance of other manufacturing industries

| Industries | Privatised firms | | Privately owned firms | | Publicly owned firms | |
|--|--|--|--|--|--|--|
| | short term impact (5-yr post-reform change) | long term impact (10-yr post-reform change) | short term impact (5-yr post-reform change) | long term impact (10-yr post-reform change) | short term impact (5-yr post-reform change) | long term impact (10-yr post-reform change) |
| <i>Profitability (returns on sale ratio)</i> | | | | | | |
| cement | improved | declined * | improved* | declined | declined | declined |
| automobile | improved | improved* | improved | improved | improved | improved |
| chemical | declined | declined * | improved | improved | declined | declined |
| engineering | declined* | declined* | declined | declined | declined | declined |
| cooking oil | declined* | declined* | declined* | declined | declined* | declined* |
| <i>Efficiency (sale to asset ratio)</i> | | | | | | |
| cement | declined | declined* | declined | declined* | declined | improved |
| automobile | declined | improved | improved* | improved* | declined* | declined* |
| chemical | improved | improved | improved* | improved* | improved* | improved* |
| engineering | declined* | declined* | improved | improved | declined* | declined* |
| cooking oil | declined | declined* | declined* | declined* | improved* | improved |
| <i>Output (inflation-adjusted (real) gross sale)</i> | | | | | | |
| cement | improved | declined | improved* | improved | declined | declined |
| automobile | declined | declined | improved* | improved* | declined* | declined* |
| chemical | improved | improved | declined* | declined* | improved* | improved* |
| engineering | declined* | declined* | declined | declined | improved | improved |
| cooking oil | declined* | declined* | declined* | declined* | declined* | declined* |
| <i>Investment (capital expenditure to total asset ratio)</i> | | | | | | |
| cement | improved* | declined | declined | declined* | improved | declined |
| automobile | declined | declined | declined | declined | improved | improved |
| chemical | improved | improved | declined | declined | declined | declined |
| engineering | declined | declined* | improved | declined | improved | improved |
| cooking oil | improved* | improved* | declined | declined | declined | declined |
| <i>Leverage (long-term loans/total equity ratio)</i> | | | | | | |
| cement | declined | declined* | declined | improved | improved | declined |
| automobile | declined | declined* | declined | declined | no impact | no impact |
| chemical | declined* | declined* | declined | declined | no impact | no impact |
| engineering | improved | improved | declined* | declined* | declined | declined |
| cooking oil | no impact | no impact | improved* | improved | no impact | no impact |

Notes: For the tests of the statistical significance of change shown by improvement or decline (measured by the difference between pre- and post-1991 median values of the respective ratios), we have used the Wilcoxon signed rank sum test (with its Z statistics) as our principal statistic. * indicates that change/impact is statistically significant.

Further analysis showed that firms operating under private ownership experienced a positive effect in the short run for three out of five industries in the first 5 years after reform and for two

industries in 10 years, but except for the immediate improved impact on the cement industry, no other improvement was statistically significant. In fact, the positive impact on the cement industry over 5 years is to some extent cancelled out by the cooking oil industry's negative impact during a similar time period. The state-owned firms managed to perform better in just one industry (automobile) but the median differences were not statistically significant. As discussed above, the automobile industry is unique since a few firms enjoy a monopoly in the domestic production of small and medium-sized cars, trucks and buses.

Hence, even after ignoring the statistical significance, it can be said that the relatively longer term impact of the broader reforms and privatisation policy on firms' profitability to some extent has not been positive except for privately owned firms in the automobile industry. The automobile industry seems to be an exceptional case in this regard, because firms earned higher ROS after the reform and privatisation policy, irrespective of ownership. Interestingly, the performance of firms that were privatised compared to those that remained in public ownership was not superior either, except for a short-term gain in the cement industry. Hence, firms' profitability appears to have been determined more by factors such as the nature of the industry rather than ownership per se; and broadly speaking, broader reforms and privatisation did not make the firms more profitable.

In terms of the evaluation of the firms' efficiency, we faced considerable problems in compiling data on the number of workers for comparable manufacturing industries. For a significant number of firms, information on this variable was either of low quality or absent altogether. Hence, as a compromise, we used the financial ratio that could represent management efficiency, and the quality of information needed to compute this ratio was also reasonable. We thus used firms' sale to asset ratio and called this asset efficiency. Based on this modified ratio of firms' efficiency, Table 3 summarises results for the non-parametric tests of differences in the medians of pre- and post-reform periods. Privatised firms were expected to operate more efficiently and improve their sale to asset ratio in both the short term and the relatively long term after change of ownership. The results in Table 3, however, depict a less rosy picture. In comparison to private and publicly owned firms, privatised firms did well only in the chemical and automobile industries (better in the relatively long run). But even then, the median value differences between pre- and post-reform periods were not statistically significant. In fact, three out of five recorded not just negative change but change that was statistically significant.

Relatively, private firms, however, performed far better in the long as well as the short run compared to both privatised and state-owned firms where sale efficiency improved for at least three out of five industries, with the improvement also being statistically significant for at least two. Even in comparative terms, state-owned firms recorded a positive and statistically significant change in at least two industries over 5 years after reform and one over 10 years. Similarly to profitability trend findings, ownership change did not appear to be the only reason for the improvement/decline in efficiency. Hence, we could summarise our results with the statement that privatised cement manufacturing firms did not significantly improve their efficiency, which was also true for the other four industries we evaluated for sensitivity analysis purposes. Similarly to the cement industry, we used firms' real sales as a proxy for output. Table 3 shows that immediately after reforms and privatisation were introduced, the privatised firms belonging to the cement and chemical industries witnessed an increase in output measured by real sales, but improvement was statistically insignificant in both cases. Nevertheless, even statistically insignificant gains in output by the privatised cement producers in the short run could not be sustained in the long run. The impact of negative output was, however, not limited to only these firms. The privatised firms from the cooking oil and engineering industries in fact witnessed a statistically significant decline in output

over both short-term and long-term post-reform time periods. Similarly, firms that remained in state ownership did not increase output irrespective of post-reform time period (5 as well as 10 years). In fact, the cooking oil and automobile industries had significantly reduced real sales. The only exceptions were the firms from the chemical industry. Firms set up and operated by private ownership belonging to the cement and automobile industries did better over a shorter post-reform time period. This positive trend, however, continued only for the automobile industry over the 10-year post-reform period. Private firms belonging to the cooking and chemical industries had consistently reduced real sales over both 5- and 10-year periods after reform. Thus, in general, although privatised cement manufacturers did not significantly improve output, this trend was not dissimilar to other ownership firms from four other industries.

A long trend of under-investment was expected to be reversed after the change of ownership. By comparing the cement industry with similar industries that had gone through a change of ownership, we used the capital expenditure to total asset ratio for our sensitivity analysis exercise. Table 3 shows that, except for the cooking oil industry, which recorded an improvement over shorter as well as longer time periods, the capital investment performance of privatised firms was less than satisfactory. The privatised cement manufacturing firms made a significant investment in building, machinery and equipment in the initial 5 years after reform, and the increase was statistically significant, but it could not continue beyond a few years. The privatised firms belonging to the chemical industry improved in capital investment but the improvement was statistically insignificant. Interestingly, privatised firms of the engineering industry recorded a statistically significant decline, and in the long run the decline also was statistically significant. The privately owned firms as well as those remaining in the public sector did not experience any statistically significant change over shorter or longer periods following reform and privatisation. The only exception came from the firms in the cement industry, which recorded a statistically significant decline over the 10-year post-reform period. Privatised firms did not do exceptionally well in terms of investing in capacity additions or technology upgrades when compared to competing firms. The cooking oil industry seems to be an exception due to low capital intensive technology and smaller funds requirements.

Another indicator of operational efficiency and long-term survival is firms' financial commitments in term of interest expenses arising from short- and long-term borrowing levels and firms' capacity to meet these expenses over a shorter and relatively longer time frame. We used LEVER to compare the cement industry with other manufacturing industries. Conclusions derived from Table 3 for the privatised firms, irrespective of industry, show that the cement industry case study results are generally similar to other industries for short and relatively longer post-reform periods. Except for the engineering industry, the privatised firms deleveraged themselves after transfer of ownership; in the worst case scenario, there was no significant change. For the group of privatised firms from the chemical industry, this deleveraging impact was statistically significant for the 5-year post-reform period. This deleveraging impact was stronger over 10 years for three industries: cement, automobile and chemical. Interestingly, for the engineering industry, the impact was opposite that of the group of privately owned firms and was statistically significant compared to privatised firms from the same industry. For state-owned firms, in the majority of cases, there was no change and almost all differences in median values of pre- and post-reform periods were statistically insignificant. Hence, privatised cement industry firms in fact deleveraged themselves over 10 years after the change of ownership, a trend that was broadly similar to other industries. Interestingly, in this case, the performance of privatised firms was relatively better than competing privately owned and state-owned firms but was broadly expected to continue in a more competitive environment in the longer time period without any recourse to state funds.

6. Conclusion

Overall cement industry as well as the group of private and privatised firms became more profitable in the first 5 years after the reforms, but since then has become significantly less profitable compared to pre-reform levels. None of the firms that remained in state ownership after the first phase of privatisation improved profitability, even during the period when other ownership firms were performing relatively well. Firms' efficiency measured by capacity utilisation indicate that the industry as a whole, as well as private and privatised firms, recorded a significant improvement immediately after reforms, but then a statistically significant decline over a 20-year post-reform period. The estimates for arranging a cushion to meet financial commitment, showed that privatised firms did not improve their performance compared to the private sector. For the firms already in the private sector, the average collection period showed a significant decrease over the long run, while for privatised firms there was a significant increase, indicating a more lenient policy of credit sales in the post-privatisation regime.

The long run impact of reforms was positive on firms' leverage and net worth position. However, the industry's cash cover, in terms of cash and working capital ratios and time interest earned, was significantly reduced during this time period. Compared to state-owned firms, privatised as well as private firms decreased their leverage over a longer reform period, but the decline was only significant over a shorter time period (up to 10 years for privatised firms). The cash ratio decreased for all ownership over a longer time period, but tests did not support a significant decline for the group of privatised firms. These results further showed that working capital ratio did improve initially. Similarly, tests confirmed a significant increase in net worth of the group of privatised firms over shorter and medium term periods. There was no statistically significant change for state-owned firms irrespective of the time period chosen except in interest cover, which significantly declined over a 10-year time period. The solvency indicator represented by interest cover showed that, contrary to private sector firms, time interest earned of privatised firms declined over longer run post-privatisation time periods. Finally, the output approximated by real sales value increased significantly for the industry, for both private and privatised firms, over a longer run period. Interestingly, contrary to other types of ownership, there was no significant change for state-owned firms over shorter or relatively longer post-reform periods. Similarly, the initial impact of policy on investment expenditure for the overall industry was positive, but our estimates did not confirm that the momentum continued over longer periods. Test results confirmed an impressive improvement for privatised firms over a longer run period.

We also assembled and analysed financial and operational data from four other industries from the Pakistani manufacturing sector. Broadly speaking, profitability results obtained for the privatised cement manufacturing firms were similar to the other four industries, as these firms recorded a statistically significant decline over 10 years after privatisation. Efficiency in asset use significantly declined in a relatively longer period not only for cement manufacturing firms but for two other industries as well. For the two industries in which the impact was positive, this was statistically insignificant. The same could be said for output and investment in general, in which changes were either statistically insignificant or limited to just one industry. Finally, there was some evidence of deleveraging by privatised firms over 10 years after privatisation.

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Appendix A: Long-term impact of privatisation and other broader reforms on cement industry's financial and operational performance

| Profitability | | | | | Efficiency | | | | | Liquidity, leverage & solvency | | | | | Output/sales & investment | | | | |
|--|----------|-----------|---------|------------|------------|----------|-----------|---------|------------|--------------------------------|----------|-----------|---------|------------|---------------------------|----------|-----------|---------|------------|
| Ratios | Pre-1992 | Post-1992 | Z value | Sig. level | Ratios | Pre-1992 | Post-1992 | Z value | Sig. level | Ratios | Pre-1992 | Post-1992 | Z value | Sig. level | Ratios | Pre-1992 | Post-1992 | Z value | Sig. level |
| <i>Immediate effect (5 years after reforms)</i> | | | | | | | | | | | | | | | | | | | |
| ROS | 3.16 | 6.00 | -1.69 | 0.09 | NIE | 0.02 | 0.11 | -3.88 | 0.00 | LEVER | 37.94 | 27.07 | 1.35 | 0.18 | RSALES | 15.51 | 20.17 | -1.76 | 0.08 |
| ROA1 | 5.48 | 6.83 | -1.14 | 0.26 | SE | 0.47 | 1.18 | -7.00 | 0.00 | CR | 13.44 | 16.06 | -0.76 | 0.45 | CES | -0.10 | 0.78 | -1.89 | 0.06 |
| ROA2 | 13.49 | 14.20 | 0.54 | 0.59 | ASPE | 0.51 | 2.06 | -6.42 | 0.00 | WCR | -9.84 | -2.95 | -1.61 | 0.11 | CEA | -0.09 | 0.85 | -1.64 | 0.10 |
| OPM1 | 16.69 | 19.51 | -0.94 | 0.35 | CAPUT | 93.32 | 101.38 | -3.39 | 0.00 | NWTL | 56.39 | 67.02 | 0.10 | 0.05 | | | | | |
| OPM2 | 10.82 | 11.35 | 0.52 | 0.60 | IM | 1.14 | 1.61 | -0.92 | 0.36 | TIE | 3.67 | 5.07 | -0.35 | 0.72 | | | | | |
| GPM | 31.32 | 30.67 | 0.63 | 0.53 | ACP | 3.93 | 6.00 | -1.09 | 0.28 | | | | | | | | | | |
| <i>Medium-term effect (10 years after reforms)</i> | | | | | | | | | | | | | | | | | | | |
| ROS | 3.16 | 1.43 | 2.11 | 0.04 | NIE | 0.02 | 0.03 | 0.41 | 0.69 | LEVER | 37.94 | 30.21 | 1.85 | 0.06 | RSALES | 15.51 | 18.43 | -1.46 | 0.14 |
| ROA1 | 5.48 | 1.03 | 2.58 | 0.01 | SE | 0.47 | 1.59 | -9.92 | 0.00 | CR | 13.44 | 10.95 | 1.73 | 0.08 | CES | -0.10 | -2.14 | -0.47 | 0.64 |
| ROA2 | 13.49 | 7.08 | 4.89 | 0.00 | ASPE | 0.51 | 2.56 | -8.96 | 0.00 | WCR | -9.84 | -16.88 | 0.77 | 0.44 | CEA | -0.09 | -1.30 | 0.04 | 0.97 |
| OPM1 | 16.69 | 9.66 | 3.02 | 0.00 | CAPUT | 93.32 | 80.84 | 1.75 | 0.08 | NWTL | 56.39 | 68.20 | -2.43 | 0.02 | | | | | |
| OPM2 | 10.82 | 4.21 | 4.53 | 0.00 | IM | 1.14 | 0.76 | 1.09 | 0.28 | TIE | 3.67 | 2.15 | 2.85 | 0.00 | | | | | |
| GPM | 31.32 | 24.83 | 3.34 | 0.00 | ACP | 3.93 | 6.00 | -1.43 | 0.15 | | | | | | | | | | |
| <i>Long-term effect (20 years after reforms)</i> | | | | | | | | | | | | | | | | | | | |
| ROS | 3.16 | 1.66 | 1.64 | 0.10 | NIE | 0.02 | 0.05 | -0.82 | 0.41 | LEVER | 37.94 | 30.74 | 2.03 | 0.04 | RSALES | 15.51 | 21.76 | -4.10 | 0.00 |
| ROA1 | 5.48 | 1.22 | 2.69 | 0.01 | SE | 0.47 | 2.16 | -12.24 | 0.00 | CR | 13.44 | 10.65 | 1.90 | 0.06 | CES | -0.10 | -0.11 | -2.05 | 0.04 |
| ROA2 | 13.49 | 7.56 | 5.22 | 0.00 | ASPE | 0.51 | 4.93 | -11.62 | 0.00 | WCR | -9.84 | -12.69 | 0.28 | 0.78 | CEA | -0.09 | -0.05 | -1.71 | 0.09 |
| OPM1 | 16.69 | 10.23 | 2.91 | 0.00 | CAPUT | 93.32 | 76.78 | 4.23 | 0.00 | NWTL | 56.39 | 72.53 | -4.97 | 0.00 | | | | | |
| OPM2 | 10.82 | 4.26 | 5.05 | 0.00 | IM | 1.14 | 0.75 | 1.44 | 0.15 | TIE | 3.67 | 2.18 | 2.68 | 0.01 | | | | | |
| GPM | 31.32 | 24.72 | 3.29 | 0.00 | ACP | 3.93 | 5.10 | -1.36 | 0.17 | | | | | | | | | | |

Notes: This table presents the median values for pre- and post-reform periods. The pre-reform period covers from 1986 to 1991. For the tests of the significance of median change, we have used the Wilcoxon signed rank sum test (with its Z statistics) as our principal statistic. The “Sig. level” column shows the significance level for the null hypothesis that the difference between two median values is zero. Ratios are calculated as follows: return on sales (ROS) = net after tax income/gross sales, return on assets (ROA1) = profit before tax/assets, return on assets (ROA2) = gross profit (loss)/assets, operating profit margin (OPM1) = (gross profit (loss) – admin. & selling exp.)/net sale, operating profit margin (OPM2) = (gross profit (loss) – admin. & selling exp.)/assets, gross profit margin (GPM) = (gross profit (loss) + depreciation)/net sale, net income efficiency (NIE) = net after tax income/labour, sales efficiency (SE) = net sales/labour, assets efficiency (AE) = assets/labour, capacity utilisation (CAPUT) = actual production/production capacity, interval measure (IM) = (cash and bank balance + short-term investment)/financial expenses, average collection period (ACP) = trade receivables/(net sale/360), leverage ratio (LEVER) = long-term loans/total equity, cash ratio (CR) = (cash and bank balance + short-term investment)/current liabilities, working capital ratio (WCR) = (current assets - current liabilities)/current liabilities, net worth to total liabilities (NWTL) = (assets -current liabilities)/total liabilities, time interest earned (TIE) = (gross profit – admin. + selling exp. & depreciation)/financial expenses, real sales (RSAL) = gross sales/cpi (cement), capital expenditure to sale (CES) = [fixed assets – fixed assets_{t-1}] / net sales, capital expenditure to assets (CEA) = [fixed assets – fixed assets_{t-1}] /total assets.